

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF HAWAI'I

NATIONAL ASSOCIATION FOR  
GUN RIGHTS; RONDELLE AYAU;  
JEFFREY BRYANT,

Plaintiffs,

v.

ANNE E. LOPEZ, in her official  
capacity as Attorney General for the  
State of Hawai'i,

Defendant.

Civil No. 1:22-cv-404-DKW-RT

**DECLARATION OF JAMES E.  
YURGEALITIS**

**DECLARATION OF JAMES E. YURGEALITIS**

I, James E. Yurgealitis, declare under penalty of perjury that the following is true and correct:

1. I have been engaged by the Department of the Attorney General, State of Hawaii to provide research and opinions in this case.

2. This declaration is based on my own personal knowledge, research, and experience, and if I am called to testify as a witness, I am able to testify competently to the truth of the matters discussed in this declaration.

3. I am being compensated at a rate of \$400 per hour for my work on this report as well as any additional work required. My travel + work rate is \$1600

per day.

## **I. PERSONAL BACKGROUND AND QUALIFICATIONS**

4. I am currently self-employed as a Legal and Forensic Consultant, providing firearms related technical and public policy consulting, testing and training services to corporations, legal counsel, and the public sector. A detailed description of my work experience, education, and training are included in my Curriculum Vitae, which is attached as **Exhibit A** to this report. I have also included, as **Exhibit B**, a statement of my qualifications as an expert witness in the areas relevant to my experience.

5. I am a former Senior Special Agent/Program Manager for Forensic Services for the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), U.S. Department of Justice, a position I held for nine years prior to my retirement. In that capacity, I was responsible for all ATF firearms and forensic firearms related training and research at the ATF National Laboratory Center (NLC) in Ammendale, MD.

6. Prior to my tenure at the ATF NLC, I was employed as a federal law enforcement officer, in various capacities, for approximately 16 years.

7. As detailed in **Exhibits A and B**, I have extensive training and experience with respect to firearms in general, as well as their history, manufacture, operation, and use.

## **II. GENERAL FIREARMS TERMINOLOGY AND OPERATION**

8. Modern firearms operate utilizing the expanding gases generated by the rapidly burning gunpowder contained in modern ammunition. Gunpowder (or smokeless powder) is the propellant contained within metallic cartridges or shotshells utilized by modern firearms. A single cartridge or shotshell is also referred to as a “round” of ammunition. Once chambered or loaded in a modern firearm, and the trigger is pulled, the primer at the base of the cartridge or shotshell is struck by a firing mechanism. The primer contains a pressure sensitive explosive compound which ignites when struck. The ignition of the primer, in turn, ignites the main powder charge contained in the case of the cartridge or shotshell. The main powder charge ignites and burns rapidly in what is essentially a contained explosion.

9. This contained explosion generates gases at enormous pressures. The generated gases push the projectile out of the mouth of the cartridge, down the barrel of the firearm and out of the firearm through the muzzle.

10. More simply defined, a firearm is a weapon which utilizes the gas pressure generated by the burning gunpowder (explosive) in a modern ammunition cartridge to propel a projectile through the barrel and out of the firearm through the muzzle.

11. All modern Breech loading firearms, no matter the type, operate

according to a nine-step process known as the “Cycle of Fire”. A Breech Loading firearm is one in which the cartridge is loaded and fired from the breech (back) end of the barrel as opposed to a Muzzle Loader wherein the propellant / powder and bullet are loaded from the muzzle (front) end. The Association of Firearm and Toolmark Examiners (AFTE) is a professional organization for Forensic Firearm and Toolmark Examiners which, in conjunction with the U. S. Department of Justice (USDOJ), National Institute of Justice (NIJ), has created a training program for apprentice forensic firearm and toolmark examiners. As these steps will be referenced throughout this report they are included here for reference:

[https://projects.nfstc.org/firearms/module08/fir\\_m08\\_t04.htm](https://projects.nfstc.org/firearms/module08/fir_m08_t04.htm).

The AFTE training program has outlined the nine steps of the Cycle of Fire as:

1) Feeding:

Feeding refers to the process for insertion of cartridges into the chamber; the breech bolt pushes the cartridge into final position.

Typically, the incoming round slides across the bolt or breech face during this caroming action. The feeding function can be manual or performed by various kinds of magazines and clips. For example, machine guns use belts of cartridges.

2) Chambering:

Chambering is the insertion of the cartridge into the chamber. If a cartridge of the incorrect length or diameter is used or if there is foreign matter in the chamber, chambering may be obstructed, causing a malfunction. Excess oil or grease in the chamber may cause overpressure, resulting in a ruptured cartridge case and potentially serious accidents.

3) Locking:

The breech bolt mechanism locks the cartridge into position in the barrel before firing. Most quality firearms are equipped with an interrupter mechanism that disconnects the trigger from the firing pin, thus making it impossible to fire until the mechanism is safely locked. This critical relationship is referred to as timing. (Blowback mechanisms involve a spring-held bolt; the mechanism is not technically locked, it is held together by spring tension and bolt inertia.)

4) Firing:

When the breech is fully locked, a pull on the trigger mechanically translates to the firing pin release. In the cocked position, the firing pin has a hammer behind it with a spring forcing it towards the primer, restrained only by a sear that is engaged by the trigger. A pull

on the trigger trips the sear from the engaging notch in the hammer.

The hammer, actuated by a cocked spring, drives the firing pin sharply against the percussion sensitive primer, which fires the cartridge.

5) Obturation:

Obturation occurs when powder gases under high pressure (e.g., two and one-half tons per square inch in the .30 06 Springfield cartridge) are sealed to prevent them from jetting between primer cup and cartridge case, cartridge case and primer wall, and projectile and bore. Cartridge cases must be sufficiently flexible to expand against the chamber wall and transmit the instantaneous powder pressure to the barrel metal that surrounds the chamber. When the chamber pressure has returned to zero, the cartridge case must also be flexible enough to release itself from the chamber wall (even though it is now pressure form fitted to the chamber). Likewise, the primer cup has been pressure held against the side of the cartridge case and depends upon the face of the breechblock for locked support during the interval of high chamber pressure. Obturation also occurs with the projectile; bullets are made sufficiently larger than the bore diameter to extrude into the rifling grooves and seal the gases.

6) Unlocking:

This is the reverse of the locking process and is frequently performed in conjunction with extraction.

7) Extraction:

Although cartridge cases do not commonly exceed their elastic limit during firing, they have a tendency to stick to the chamber after firing. After firing, cartridge cases are larger in diameter than before firing. If the fired cartridge case is intended for reloading, it must be full length resized in a reloading die. All cartridge cases are designed with a rim or groove (cannelure) at the base so that an extractor claw can grasp this edge in order to achieve extraction.

8) Ejection:

In the final stages of extraction, the cartridge case encounters a projection that is usually at right angles to the exit portal of the breech. Rotating on the fulcrum of the extractor the case base is contacted on the opposite side by the ejector, which flips the case out of the actuating mechanism.

9) Cocking:

The hammer spring is usually cocked when the bolt of a rifle, pistol, or repeater shotgun is retracted. An exception to this is the M 1917

Enfield Rifle, which cocks upon forward motion of the bolt. Exposed hammer may be cocked by manual retraction, using the thumb. The Walther series of pistols provides for manual cocking or trigger pull cocking (double action), as do most open hammer revolvers.

12. Additional definitions often used when classifying firearms (in general)

are:

Semiautomatic, Full Automatic and Select Fire:

a. Semiautomatic:

Refers to a repeating/ self-loading firearm that fires one shot for each pull of the trigger until the ammunition supply is exhausted. The energy of the fired cartridge is utilized to cycle the mechanism of the firearm to feed and chamber the next shot.

b. Full / Fully Automatic:

Refers to a firearm that will continuously fire successive shots when the trigger is pulled, and will only stop when the trigger is released or the supply of ammunition is exhausted. Commonly referred to as a machine gun.

c. Select Fire:

A firearm capable of switching between and functioning in either fully automatic or semiautomatic fire mode. Alternatively, some firearms



can fire in “burst mode” meaning automatically with a mechanical limitation on the number of shots.

13. Additional definitions relevant to any discussion regarding firearms in general, and this declaration in particular, are Rifling, Caliber and Gauge.

a. Rifling:

Rifling refers to a series of grooves cut or impressed inside the barrel in a spiral pattern. The “high” portions of these patterns are called “Lands”. The “lower” portion of this pattern are called “Grooves”. When a projectile (or bullet) is fired in a “rifled” firearm, it comes into contact with the lands as it leaves the chamber and begins to travel down the barrel. Because the lands are oriented in a spiral pattern, the rifling imparts a spin to the projectile which improves stability and accuracy.

b. Caliber:

Caliber is a dimensional measurement of the inside (or bore) of a rifled barrel. In the United States, caliber is traditionally expressed in fractions of an inch. For example, a .22 caliber firearm is designed to chamber and fire a projectile which measures .22 inches (or slightly less than a quarter of an inch). A .50 caliber firearm chambers and fires a projectile which is approximately a half inch in diameter.

In Europe, and the majority of other countries utilizing the metric system, caliber has historically been expressed in millimeters (mm). Therefore, a 9mm firearm is designed to chamber and fire a projectile with a diameter of 9mm. European caliber designations may also include measurement of the length of the cartridge case (9x19mm, 7.62x39mm, *etc.*).

A number of firearm calibers widely manufactured have two separate caliber designations, one in inch measurements and one in metric, which are equivalent and interchangeable. For example, .380 caliber ammunition in the US is referred to as 9x17mm caliber in Europe.

It is important to note for the purposes of this declaration that the caliber designation of any given ammunition cartridge usually refers only to the diameter of the projectile (bullet) and not the relative “power” of the cartridge itself (in terms of muzzle energy, effective range and muzzle velocity). For example, there is an important distinction between cartridges commonly referred to as .22 caliber and cartridges commonly referred to as .223 caliber.

.22 caliber ammunition is a popular and relatively low power cartridge developed in the 1880s. It is also known as “.22 rimfire” as

the primer mixture in the cartridge is seated in the rim of the cartridge and not contained in a separate primer cup in the cartridge base. It is commonly used for target shooting as well as hunting small game and can be fired from both handguns and rifles chambered in that caliber. Bullet weights for .22 caliber projectiles / bullets are typically between 30-60 grains (0.08 to 0.13 ounces). Muzzle velocities are usually in the 1100-1300 feet per second (fps) range.

.223 caliber ammunition by comparison is a high velocity cartridge developed in the 1950s in part for use in the original AR-15 and M-16 rifles. It is a “centerfire cartridge.” Although the diameter of the projectile / bullet is only slightly greater (approximately the width of a human hair) than the .22 caliber cartridge mentioned previously, it is a vastly more powerful cartridge in terms of muzzle velocity and range. This caliber ammunition is also somewhat interchangeable with 5.56mm ammunition. Here is a side-by-side comparison of .223 (left) and .22 caliber cartridges (right) with a quarter for size reference:



Common bullet weights for .223 / 5.56mm caliber projectiles are 50 to 62 grains + or- (0.11 to 0.14 ounces)—heavier than .22 caliber projectiles. And common muzzle velocities are approximately 3,200 to 3,500 feet per second—about three times as fast as .22 caliber projectiles. A heavier bullet and increased velocity equate to more of the cartridge’s energy being transferred to the target. The National Rifle Association (NRA) American Rifleman Magazine tested the U.S. Army’s new .223 caliber cartridge (M855A1) in 2014 and the results are published here:

<https://www.americanrifleman.org/content/testing-the-army-s-m855a1-standard-ball-cartridge/>

c. Gauge:

Gauge is a dimensional measurement which is traditionally used to denote the bore of a non-rifled or “smoothbore” firearm (i.e., a

Shotgun). Shotguns were initially designed to fire a mass of round shot as opposed to one solid projectile and therefore, a caliber designation is not readily applicable. Gauge refers to the number of lead spheres which will fit inside the bore and equal one pound. For example, in a 12-gauge shotgun you can fit 12 spheres of lead, which are approximately 18.52mm or .73 inches in diameter, the total weight of which will equal one pound. If the diameter of the spheres is increased, it will require less of them to equal one pound. Therefore, the smaller the “gauge,” the larger the dimension of the bore. The exception to this measurement system is the .410 gauge shotgun which is actually a caliber designation.

### **III. TYPES OF MODERN FIREARMS**

14. Modern firearms as currently manufactured for civilian ownership fall into two general types: handguns and long guns (or shoulder weapons).

#### Handguns:

15. Handguns are generally defined as a firearm having a short stock (grip), and are designed to be held, and fired, with one hand. The term “Handgun” defines two distinct types of modern firearms, the revolver and the pistol.

16. A revolver is a handgun designed and manufactured with a revolving cylinder to contain, chamber and feed multiple rounds of ammunition. In a modern

double action revolver, pulling the trigger rotates the cylinder bringing an unfired cartridge of ammunition in line with the barrel and firing pin. Pulling the trigger also cocks the hammer and then releases it either directly (or indirectly via a firing pin) to strike the primer of the cartridge, initiating the firing sequence as stated previously. In this type of revolver, the trigger must again be pulled to rotate the cylinder in order to fire another cartridge. When all cartridges have been fired, the cylinder is unlocked from the frame and swings out to facilitate removal of expended cartridge casings and insertion of unfired cartridges. The cylinder is then closed and relocked within the frame and the handgun is again ready to fire when the trigger is pulled.

This animation details the overall operation and key components:

[https://www.youtube.com/watch?v=TXliIJ\\_66FQ](https://www.youtube.com/watch?v=TXliIJ_66FQ)

17. A pistol is a handgun designed and manufactured with the firing chamber as an integral part of the barrel and utilizes a “box” magazine to contain and feed multiple rounds of ammunition. In this type of handgun, generally, the box magazine is inserted into the firearm, the slide or bolt is pulled back and released which springs forward and feeds a cartridge into the chamber. When the trigger is pulled a firing pin or striker is released which impacts the primer of the cartridge and initiates the firing sequence of the ammunition. In most pistols, a portion of the recoil or gas pressure generated by firing the cartridge is utilized to

move the slide rearward, extract and eject the expended cartridge case and chamber another round from the magazine. This sequence can be repeated by pulling the trigger once for each shot. The pistol can then be reloaded by removing the empty magazine and inserting a loaded magazine (or refilling a permanently affixed magazine if the pistol is so configured). The overall operation of a Colt 1911 .45 Caliber pistol is illustrated in this animation:

<https://www.youtube.com/watch?v=EjQrhDKDWFk&t=12s>

A Single Shot Pistol refers to a handgun which has no internal magazine capacity and requires the operator to manually reload the firearm after each shot fired.

#### Long Guns/ Shoulder Weapons:

Long Guns are generally of two distinct types: rifles and shotguns.

A rifle is a firearm which is designed and intended to be fired from the shoulder. It fires a single shot through a rifled bore for each pull of the trigger.<sup>1</sup> A shotgun is a firearm which is also designed and intended to be fired from the shoulder. It fires either a number of ball shot (commonly termed “buckshot” or “birdshot”) or a single projectile (commonly termed a “slug”) through a smooth (non-rifled) bore for each pull of the trigger.

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<sup>1</sup> Machine guns (any firearm with the capacity to fire more than one shot with each pull of the trigger) are defined separately under federal law.

a. Rifles:

Historically speaking, rifles are the oldest type of firearms in existence. In terms of “types” of rifle, there are numerous variations. All of these variations, generally speaking, are defined and distinguished by the way they are loaded and reloaded. For example, single shot rifles fire one shot for each pull of the trigger. They have no internal or external magazine capacity and must be reloaded with a new unfired cartridge by hand for each shot. Many of these have a hinged or “break open” receiver to facilitate loading and unloading.

A Pump Action Rifle requires the operator to manually manipulate a forearm piece which is traditionally found underneath the barrel. After firing, the forearm is pulled backward which unlocks the bolt, extracts and ejects the fired cartridge case. Pushing the slide forward feeds an unfired cartridge from the magazine, cocks the firearm mechanism and locks the bolt for a successive shot. Pump action rifles have been manufactured with both tubular and detachable box magazines. Here is a relevant animation:

<https://www.youtube.com/watch?v=jyyQqXGUSx8>

Bolt Action Rifles require the operator to manually manipulate the bolt of the rifle. After firing, the bolt is first unlocked from the



chamber and then moved rearward. This action also extracts and ejects the expended cartridge case. The bolt is then moved forward which feeds an unfired cartridge from the magazine into the chamber. Once the bolt is then again locked by the operator, it is ready to fire. Bolt action rifles usually have an internal fixed magazine or tubular magazine which will facilitate reloading via manipulation of the bolt until that capacity is exhausted. Bolt-action rifles were generally the choice of military forces, hunters and sportsmen through the end of World War II. Here is a relevant animation:

<https://www.youtube.com/watch?v=u9Luu7R4WVw>

A lever action rifle is similar to the bolt action rifle in that the operator is required to manipulate the mechanism, or “action”, of the firearm. A lever at the bottom of the receiver of the rifle is manipulated in an up and down motion in order to unlock the bolt and move it rearward, extract and eject the expended cartridge case, feed an unfired cartridge into the chamber and lock it. The operator’s action is required for each shot fired through the rifle. Generally speaking, lever action rifles are manufactured with tubular magazines which will vary in capacity depending on the caliber of the firearm. Here is a relevant animation:

<https://www.youtube.com/watch?v=58LbxVd4buo>.

A semiautomatic rifle utilizes the energy generated by the firing of the cartridge to power the cycle of fire. This is accomplished by siphoning off a portion of the gases generated by firing to operate the mechanism or by utilizing the recoil generated by firing much as in a semiautomatic pistol as described previously.

Once loaded, the operation of this cycle of fire is not dependent on the operator to effect any portion of the process other than to pull the trigger. Semiautomatic rifles are, and have been previously, manufactured with both fixed internal magazines and a capacity to accept detachable external magazines. As such, this type of rifle is capable of firing with each pull of the trigger until the supply of ammunition is exhausted. As stated previously, the majority of military firearms until the end of World War II were bolt action. The exception to this rule was the United States entering the war with the semiautomatic M1 (Garand) .30-06 caliber rifle as standard issue. The Garand had a fixed internal magazine with an eight round capacity. As discussed below, since the end of World War II, virtually every military organization across the globe has adopted a form of semiautomatic or select fire rifle, from among one of a series of

designs. Here is a relevant animation:

<https://www.youtube.com/watch?v=jlCV6yellTI>

b. Shotguns:

Modern shotguns, as stated previously in regard to rifles, are generally classified and characterized by their operating system (i.e., the manner in which they function, are loaded and reloaded).

Shotguns with multiple barrels are defined by placement or orientation of their barrels.

Single Shot Shotguns function similarly to the single shot rifle. They may have a hinged receiver which allows the operator to open the action at the chamber area to facilitate loading and unloading of the firearm. There are also single shot models that are loaded and unloaded through a bolt action mechanism and have no additional magazine capacity.

Bolt Action shotguns are manufactured, as stated above, as single shot, or with internal or detachable magazines to facilitate easier and faster reloading. They function in the same way as a bolt action rifle and require manual manipulation of the bolt by the operator to unload and reload.

Lever Action Shotguns again function in the same fashion as a

similarly designed rifle. Manual manipulation of the lever is required for successive shots.

Pump Action Shotguns have the same general operating system as a similarly designed rifle. The “action” of the shotgun must be worked forward and back by the operator to unlock the bolt, extract and eject the expended shotgun shell, reload and relock the bolt for firing.

Semiautomatic Shotguns, as with their rifle caliber counterparts, utilize energy (either recoil or gas pressure) generated by firing ammunition to “power” the operating system of the firearm. These are manufactured with a number of different magazines, both internal and fixed, as well as external and detachable. They are capable of firing a single shot with each pull of the trigger until the supply of ammunition in the magazine is exhausted.

Break Open, Double Barrel and “Tip Up” Shotguns have a hinged receiver which facilitates access to the rear of the chamber for unloading and reloading. They are manufactured in single shot and double barrel variations. Double barrel variations are further delineated by the placement of their barrels. Side by Side Shotguns have two barrels situated next to one another in a horizontal

arrangement. Over and Under Shotguns have two barrels superimposed upon one another in a vertical plane. The mechanisms in each of these allow staggered firing of each of the two barrels with a separate pull of the trigger. When the hinged action is opened, the expended shotgun shell hulls can be manually extracted although more complex designs with auto ejectors perform that function when “opened” without action by the operator. Here is a relevant animation:

<https://www.youtube.com/watch?v=XXOYekeYIPo>

18. Other Types of Firearms: There are additional types and classifications of firearms not discussed at length here for brevity and because they are less relevant to my opinions. An example of this type of firearm is a “Drilling” which consists of a shotgun and rifle mounted to the same receiver. Other types of firearms such as smoothbore revolvers, Short Barreled Shotguns, Short Barreled Rifles and Machineguns are regulated by ATF under the auspices of the National Firearms Act (NFA). Manufacture, transfer and ownership of these “NFA Firearms” is subject to more stringent regulations that include registration in a Federal Database.

#### **IV. DEVELOPMENT OF ASSAULT WEAPONS**

19. In recent years there has been an increase in the availability in the United States of semiautomatic rifles, pistols and shotguns with features initially

designed (or patterned after those designed) for a military purpose. As the connection between these weapons and weapons designed for military use is intrinsically relevant to this case, it is important to discuss the history of the development and evolution of firearms with these features. A discussion regarding the development and capabilities of handguns based on AR & AK type rifle receivers is also relevant to this case.

20. It is generally recognized that the first “Assault Rifle” or “Assault Weapon” is the German StG 44 (Sturmgewehr Model 1944) which appeared in production form late in WWII. Noted firearms historian and expert Ian Hogg referred to it as “The Father of all today’s assault rifles.”<sup>2</sup>



Image Source: <https://www.recoilweb.com/sturmgewehr-the-first-assault-rifle-100907.html>

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<sup>2</sup> “Military Small Arms of the 20th Century,” Edition” Hogg Ian V. and Weeks, John S., Krause Publications, Iola, WI, 2000, pp. 243.

Earlier pre-production variants included the MP 42 and MP 43 (Machinenpistol 1942 and 1943 respectively). The Germans termed the rifle “Sturmgewehr,” literally “Storm Rifle,” and a number of the features included utilization of a portion of the gas generated by the burning cartridge propellant to reload and operate the rifle, extensive use of steel stampings in its construction, a detachable magazine, a separate pistol style grip (not integrated with the shoulder stock), a bayonet mounting lug and a threaded barrel to facilitate the attachment of a grenade launcher. It fired a cartridge that was smaller dimensionally and less “powerful” (in terms of muzzle velocity and foot pounds of energy) than the standard 8mm Mauser cartridge in use by the German Army in their standard issue bolt action Mauser K98 rifles.

It is important to note that the features designed into the German StG 44 were intended to increase potential ease of carry & lethality in battle. In general, it is widely accepted that, in the design of military small arms, ‘form follows function’ and innovations primarily serve to increase the firepower and lethality of the individual combatant.

21. Following the end of the war, captured StG 44s were analyzed by the Allies, as well as the Soviets, and although there was reluctance to move to a smaller caliber cartridge a number of the features of the StG 44 found favor in the design of successive European, American and Eastern Bloc military rifles.

Noted firearm expert and historian Jim Supica wrote in his forward to the book “Guns”<sup>3</sup>

“Most military establishments hesitated to ‘downsize’ the range and power of their primary rifles in the early Cold War years. The semi-auto detachable magazine concept was an obvious success and there was something to be said for full auto capability.”<sup>4</sup>

He further writes:

“However the assault rifle concept wouldn’t go away. The Soviet Union accepted the lower power round idea in its fixed magazine semi-auto chambered for an intermediate power 7.62 x 39 mm round in 1945, the SKS, which saw wide distribution and production in Soviet client states.”<sup>5</sup>

Two years later, in 1947, the USSR followed the SKS with what Supica terms: “The quintessential assault rifle - the Kalashnikov designed AK-47.”<sup>6</sup>

22. The design of the AK-47 carried forward a number of the features introduced on the German StG 44. These features include a gas powered operating system, use of steel stampings in its construction, a separate pistol grip, separate shoulder stock, a detachable magazine, a bayonet lug and provision for attachment of a grenade launcher. Due to the separate stock and pistol grip, the AK, much like the StG 44, also utilized a barrel shroud at the forward third of the rifle. Some variations of the early AK-47s (AKM) also featured a compensator at the muzzle

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<sup>3</sup> Supica, Guns (TAJ Books, 2006), pages 26-28.

<sup>4</sup> *Id.*, p.28.

<sup>5</sup> *Id.*, p.28.

<sup>6</sup> *Id.*, p.28



that deflected gas upward and to the right to compensate for the rifle's tendency to kick up and to the right with every shot.

23. In the 1950s numerous Nations sought to replace WWI and WWII vintage bolt action and semiautomatic rifles with these newer and more effective designs. With the birth of the North Atlantic Treaty Organization (NATO), however, utilization of Soviet Bloc AK or SKS Assault Rifles was not possible. Accordingly, a number of firearms manufacturers outside the Soviet sphere of influence developed military rifles which carried forward these same features to one extent or another. Fabrique Nationale (FN) of Herstal, Belgium and Heckler Koch (HK) of Oberndorf, Germany are two noteworthy examples.

24. FN developed the FN-FAL (Fusil Automatique Leger) and HK the G3 which found a ready market amongst nations that did not favor the Soviet AK type designs. Both incorporated features which, like the AK, were derived directly from the StG 44. Their designs featured some parts made from metal stampings as opposed to heavier and more expensive machined steel pieces. A separate pistol grip, shoulder stock, detachable magazine and barrel shroud followed the basic design of the StG 44. A flash hider and / or muzzle brake have appeared in production variations of both rifles. These rifles were destined from inception to become widely exported as the domestic market in both countries was relatively limited. The FN- FAL and G3 have been in production since the 1950s and both

FN and HK have licensed production to numerous countries in South America, Africa and the Middle East.

25. By the late 1950s through the late 1960s most nations who could afford to do so had replaced early 20th century rifle designs with these newer and more effective rifles for their military forces.

26. In the United States, progress in this arena moved at a significantly slower pace. The prevailing wisdom here was to stay away from lighter, smaller rifle calibers and cartridges as the .30-06 cartridge used in the M-1 Garand Rifle during WWII had proven to be more than successful. Their initial answer to the burgeoning move towards assault rifles was a variation of the basic M-1 Garand operating system, the T44, or M-14. Outwardly, the M-14 retained a full length wood stock as did the Garand, however it featured a detachable magazine, select fire (both semiautomatic and full automatic) capability as well as a flash hider. It competed directly against the FN-FAL (designated T88) in U.S. Army trials and was selected in 1957.

27. In the mid 1950s ArmaLite Corporation's chief engineer, Eugene Stoner, developed a number of lightweight assault rifle designs which resulted in the AR-10 in .308 caliber. Its design closely paralleled what was now becoming standard assault rifle design, i.e., light weight (aluminum forged receivers as opposed to machined steel), separate pistol grip and shoulder stock, foregrip /

barrel shroud, detachable magazine, and numerous flash hider / muzzle brake variations. ArmaLite continued to refine the basic design of the AR-10 which resulted in the AR-15. The AR-15 was designed to chamber and fire the 5.56 x 45mm cartridge (somewhat interchangeable with .223 Remington caliber).

28. In 1961, the Department of Defense purchased a quantity of AR-15 rifles from Colt for evaluation. A number of these were subsequently shipped to U.S. Army advisors in Vietnam to test their suitability for issue to South Vietnamese Army forces. Following the field evaluation, the Department of Defense Advanced Research Projects Agency prepared a report (AD-343778, dated August 20, 1962) summarizing the results.<sup>7</sup> Amongst the data compiled via surveys of the US Army Advisors are a number of comments regarding actual use in the field and the resulting lethal injuries.

**9. (C) Remarks.** Unit Commanders' and Advisors' remarks concerning the value of the AR-15 to Vietnamese Units and its worth as a combat weapon in the war in South Vietnam as opposed to existing weapons were also requested. Generally, the comments were extremely favorable to the AR-15. All of the comments received are presented below in their entirety and in the form in which they were received.

(1) (C) "On 160900 June 62, one platoon from the 340 Ranger Company was on an operation vic. YT260750 and contacted 3 armed VC in heavily forested jungle. Two VC had carbines, grenades, mines, and one had a

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**ANNEX "A"**

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<sup>7</sup>Advanced Research Projects Agency, Office of the Secretary of Defense, Field Test Report, AR15 ArmaLite Rifle, at 24 (July 31, 1962), available at <https://apps.dtic.mil/sti/pdfs/AD0343778.pdf>.

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**SMG. At a distance of approximately 15 meters, one Ranger fired an AR-15 full automatic hitting one VC with 3 rounds with the first burst. One round in the head-took it completely off. Another in the right arm, took it completely off, too. One round hit him in the right side, causing a hole about five inches in diameter. It cannot be determined which round killed the VC but it can be assumed that any one of the three would have caused death. The other 2 VC ran, leaving the dead VC with 1 carbine, 1 grenade and 2 mines. " (Rangers)**

**(2.) (C) "On 9 June a Ranger Platoon from the 40th Inf Regt was given the mission of ambushing an estimated VC Company. The details are as follows:**

- a. Number of VC killed: 5**
- b. Number of AR-15's employed: 5**
- c. Range of engagement: 30-100 meters**
- d. Type wounds:**
  - 1. Back wound, which caused the thoracic cavity to explode.**
  - 2. Stomach wound, which caused the abdominal cavity to explode.**
  - 3. Buttock wound, which destroyed all tissue of both buttocks.**
  - 4. Chest wound from right to left, destroyed the thoracic cavity.**
  - 5. Heel wound, the projectile entered the bottom of the right foot causing the leg to split from the foot to the hip.**

**These deaths were inflicted by the AR-15 and all were instantaneous except the buttock wound. He lived approximately five minutes.**

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29. Despite some initial reliability problems due to improper maintenance by operators the rifle was adopted as standard issue by the U.S. Army in the mid 1960s. The production of the rifle had been licensed to Colt and initially the model designation was, as produced, AR-15.



Image Source: “The Black Rifle”, P.95. (see bibliography)

30. Shortly thereafter a series of engineering changes were introduced by Colt and the standard US military designation was changed to M-16. When initially deployed as standard issue rifle for U.S. Military Forces the AR-15 / M-16 platform was maligned as unreliable and prone to jamming. This was due, in part, to inadequate maintenance by the operators themselves. Once the problems were addressed and rectified the rifle proved to be as reliable and accurate as the AK-type rifles deployed by the opposing forces in the Vietnam Conflict.

31. In the ensuing 50+ years both the military and civilian versions of the M16 / AR-15 platform have undergone numerous modifications both cosmetic and mechanical. However, the basic configuration, appearance, construction and operation of the internal gas operating system (as designed) has remained unchanged since its initial inception and acceptance as a military weapon. However, Colt continued to promote the similarity between the M-16 rifle

produced for the U.S. Military and the civilian semiautomatic variant.

32. The expiration of Colt's patents in the late 1970s naturally spawned competition in the marketplace. Throughout the design's lifespan, many of the internal fire control components have remained unchanged and their specifications standardized industry wide. There are multiple internal parts that are completely interchangeable between military M16s manufactured in the 1960s by Colt and a AR-15 type rifle produced today by any one of hundreds of U.S. manufacturers who produce either receivers or internal operating parts. For example, a Bolt Carrier manufactured in 1967 by Colt will fit, and function as designed, in an AR copy manufactured in 2017. Additionally, the overall configuration of "copycat" AR rifles remains identical to the original production design of the early 1960s. The overall design configuration (two piece hinged receiver, shoulder stock in line with the chamber and barrel, placement of the magazine, external switches and other features) are identical or nearly so.

33. As stated previously, due to their modular construction AR-type rifles are easily customized to suit the owner's personal preference. This also applies to pistols which are based on AR- & AK- type rifle receivers. The rifle receiver itself is a hinged two-piece unit and the "upper receiver" and "lower receiver" can be swapped out for other similar pieces with relative ease. The design also facilitates replacement of internal fire control components and assemblies. The following

video illustrates this:

<https://www.youtube.com/watch?v=F00FEJZbrb0>

34. It is important to note the respective characteristics of the 5.56mm / .223 caliber cartridge that influenced the U.S. Military's decision to switch over from the 7.62 x 51mm / .308 caliber round used in the preceding model M-14 rifles. Dimensionally, the 7.62 x 51mm cartridge is 71mm (2.8 inches) long overall and weighs approximately 0.9 ounces. The 5.56mm cartridge is 57mm (2.24 inches) long overall and weighs approximately 0.4 ounces.



Image Source: <https://www.intherabbithole.com/e176/>

Five pounds (80 oz.) of 7.62 ammunition would consist of 89 cartridges. Five pounds of 5.56 would consist of 200 cartridges. The lighter weight and smaller dimensions of a 5.56 / .223 caliber cartridge would allow more ammunition to be carried by an individual combatant for an equivalent weight. The shorter overall dimensions of the 5.56 also commensurately allowed for smaller



detachable magazines and / or larger capacity magazines for the same size. A 30-round magazine for a 5.56mm AR-15 rifle is smaller than a 20 round magazine for a 7.62mm M-14 rifle.

35. Performance in terms of muzzle velocity was also a consideration. The 7.62x51mm cartridge has a muzzle velocity of approximately 3200 feet per second (fps). The 5.56 cartridge has approximately the same velocity (for reference a 9mm pistol cartridge has a muzzle velocity of approximately 1100 fps). 5.56mm bullets, upon contacting tissue will “yaw” (begin to rotate on its axis) which contributes to the creation of both temporary and permanent large wound cavities. Handgun bullets, because they are heavier and travelling at a lower velocity, do not typically yaw upon contact with tissue and do not create as large of a wound cavity nor commensurate destruction of tissue. The yaw movement of a 5.56/.223 bullet can also cause it to fragment upon striking bone which contributes to additional tissue damage not immediately adjacent to the cavity itself.

36. Noted wound ballistics expert Vincent DiMaio in “Gunshot Wounds” writes,

“As the bullet enters, the body, there is ‘tail splash’ or backward hurling of injured tissue. This material may be ejected from the entrance. The bullet passes through the target, creating a large temporary cavity whose maximum diameter is up to 11-12.5 times the diameter of the projectile. The maximum diameter of the cavity occurs at the point at which the maximum rate of loss of kinetic energy occurs. This occurs at the point where the bullet is at maximum yaw, i.e., turned sideways (at a 90-degree angle to the path) and / or when it fragments. If fragmentation does not occur and the path is long



enough, the yawing continues until the bullet rotates 180 degrees and ends up in a base-forward position. The bullet will continue traveling base first with little or no yaw as this position puts the center of mass forward.<sup>8</sup>

The temporary cavity will undulate for 5-10 msec before coming to rest as a permanent track. Positive and negative pressures alternate in the wound track, with resultant sucking of foreign material and bacteria into the track from both entrance and exit. In high-velocity centerfire rifle wounds, the expanding walls of the temporary cavity are capable of doing severe damage. There is compression, stretching and shearing of the displaced tissue. Injuries to blood vessels, nerves, or organs not struck by the bullet, and a distance from the path, can occur as can fractures of bones, though, in the case of fractures, this is relatively rare. In the author's experience, fractures usually occur when the bullet perforates an intercostal space fracturing ribs above and below the bullet path."<sup>9</sup>

DiMaio further states,

"Projectile fragmentation can amplify the effects of the temporary cavity increasing the severity of a wound. This is the reason for the effectiveness of the 5.56 x 45-mm cartridge and the M-16 rifle. For the M-193 55-gr. bullet, on the average, the yaw becomes significant at 12 cm with marked tissue disruption occurring most commonly at 15-25 cm due principally to bullet fragmentation."<sup>10</sup>

37. Because of the propensity of the 5.56mm/.223 caliber round to create significant damage upon impacting living tissue, it is not generally considered nor favored as a hunting cartridge.

38. Colt sought to capitalize on the military acceptance of the AR-15 / M-16 and shortly proposed production of these rifles for sale to the civilian market.

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<sup>8</sup> DiMaio, *Gunshot Wounds*, 2d (CRC Press LLC, 1999). P. 54

<sup>9</sup> *Id.*, P. 55

<sup>10</sup> *Id.*, P. 56

Colt submitted a sample to the Treasury Department on October 23, 1963 for approval. The difference between the military and civilian versions was removal of fully automatic capability. This modification was achieved through nine changes to the fire control system. These modifications did not change the general overall appearance or semiautomatic rate of fire of the rifle.

39. The animation in this video illustrates the function of both semiautomatic and full automatic AR-type rifles. Note that the difference between the two consists of only a few parts in the trigger control group. The same basic configuration and performance of the military rifle is shared with the semiautomatic models:

<https://www.youtube.com/watch?v=omv85cLfmXU>

40. The additional features on these rifles intended to enhance their capability as Military Firearms remained to include the bayonet lug and flash hider, and the rifle was designated the Model R6000 Colt AR-15 SP-1 (Sporter). The U.S. Treasury Department approved Colt's semiautomatic version of the rifle in December 1963.

41. In their Complaint on page 4, the plaintiffs' incorrectly claim:

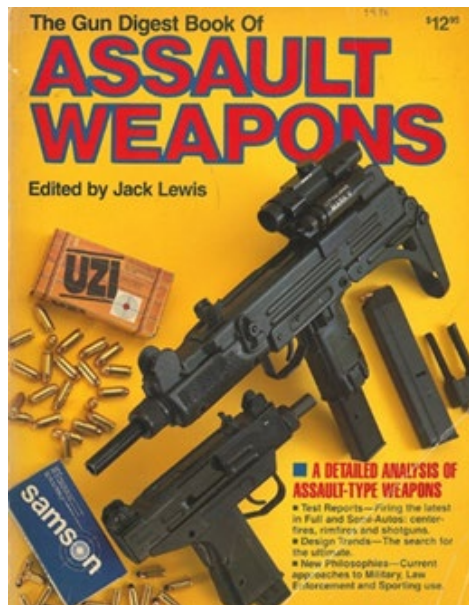
"The term 'assault pistol' is not a technical term used in the firearms industry or community for firearms commonly available to civilians. Instead, the term is a rhetorically charged political term meant to stir the emotions of the public

against those persons who choose to exercise their constitutional right to possess certain semi-automatic firearms that are commonly owned by law-abiding American citizens for lawful purposes.”

42. Contrary to the plaintiffs’ claim of political contrivance, the term “assault weapon” had already entered common use in the firearms community as early as 1986 when the “Gun Digest Book of Assault Weapons” was first published. Edited by Jack Lewis, the front cover, which prominently displays an Action Arms UZI 9mm pistol, states that it contains:

“A detailed analysis of Assault Type Weapons”

“Test Reports – Firing the latest in full and Semi Autos, centerfires, rimfires and shotguns”



On page 103, Lewis writes: “Whatever a shooter’s reasons may be for wanting one, he’ll be able to find one of these civilian-legal semi-auto assault

weapons on dealer's shelves. A number of them are detailed on the following pages.”<sup>11</sup>

On page 133, in a review of the semiautomatic Holmes MP-83 9mm pistol, Lewis refers to it as an “Assault Pistol”<sup>12</sup>

43. The firearms industry has also promoted the similarities between semiautomatic versions of their fully automatic/ select fire battle rifles for marketing purposes.

**Arm your men with confidence**

**Colt's AR-15  
Semi-Automatic  
Rifle**



**MODEL R-6000**

- Lightweight
- Weighs only 6.3 pounds
- Easy to handle
- Extremely accurate
- Straight line construction
- Simple to maintain

Colt's answer to the law enforcement agencies' demands for a semi-automatic version of the M16 automatic rifle purchased by the United States Armed Forces, painstaking engineering redesign efforts have resulted in government-approved conversion of the automatic military rifle to a semi-automatic police weapon without sacrificing any performance or weight characteristics.

**Colt Industries**  **Colt's Small Arms Division  
Security Equipment**  
150 Huxshope Avenue, Hartford, Conn. 06102

Source: <https://gearsofguns.com/old-ar-15-ads/>

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<sup>11</sup> Lewis, Jack, The Gun Digest Book of Assault Weapons, (DBI Books,1986). P.103

<sup>12</sup>*Id.*, P.103

10 9 8 7 6 5 4 3 2 1

# COLT ARMALITE AR-15 for today and tomorrow

## Controlled FIREPOWER...

**ACCURATE, POWERFUL  
AT LONG RANGE**

Unsurpassed as a Sniper Rifle both accurate and lethal, at 500 yards the AR-15 makes a complete penetration of 10 gauge steel, or both sides of a steel combat helmet. On impact the tumbling action of the .223 caliber ammunition increases effectiveness.





**GRENADE LAUNCHER**

Converts instantly without the use of supplementary attachments or adjustments with complete interchangeability of grenade launching or combat ammunition.







MANUFACTURED UNDER LICENSE FROM  
FAIRCHILD ENGINE AND AIRPLANE CORPORATION  
AND FAIRCHILD ARMS INTERNATIONAL LIMITED  
**BY COLT'S PATENT FIRE ARMS  
MANUFACTURING COMPANY, INC.,**  
HARTFORD 15, CONNECTICUT, U.S.A. PATENTS PENDING.  
CABLE "COLT" HARTFORD, U.S.A.

*117 From the first Colt AR-15 brochure, produced in a desperate attempt to interest somebody - anybody - in the merits of the AR-15's "unmatched superiority".*

Source: "The Black Rifle", p. 98. Full citation in bibliography



44. The term “Assault Pistol” is also used by those in the firearm industry:

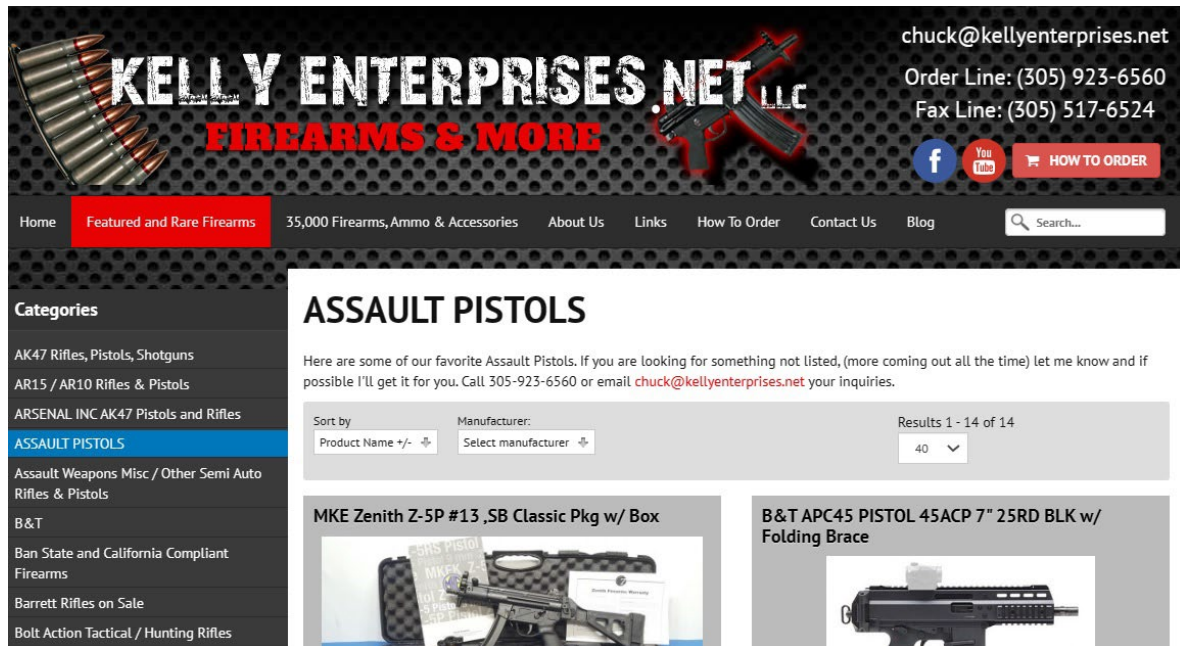


Image source: <https://www.kellyenterprises.net/firearms/assault-pistols.html>

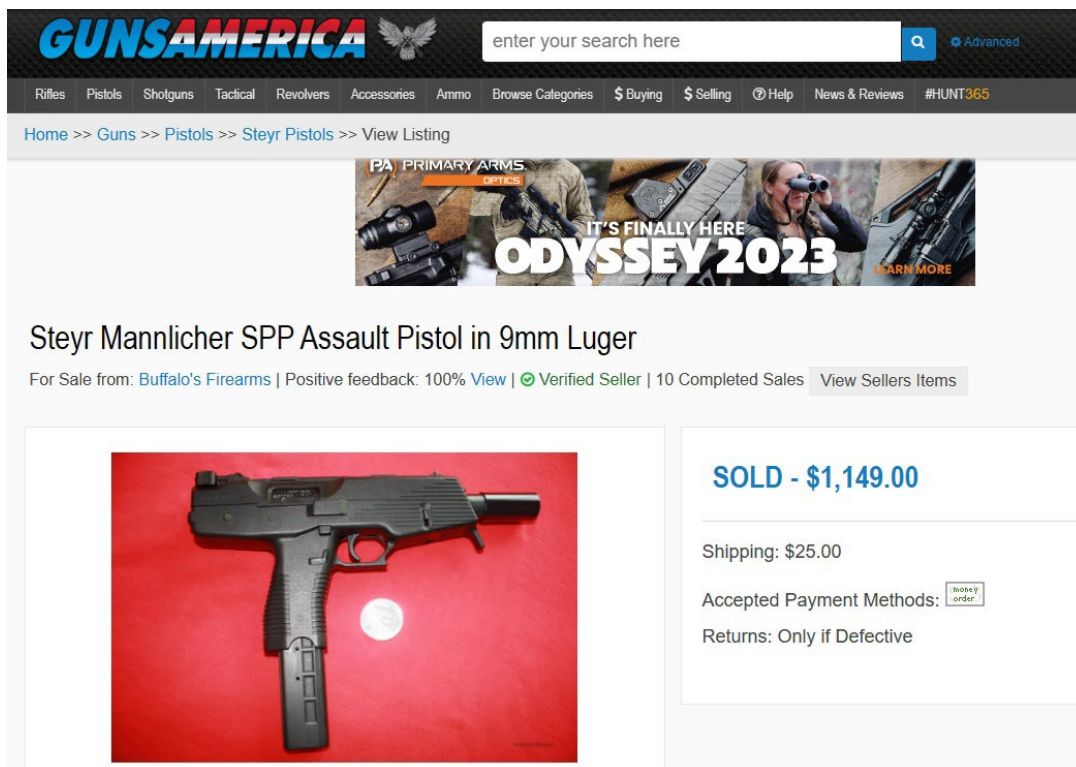


Image source: <https://www.gunsamerica.com/987215442/steyr-mannlicher-spp-assault-pistol-in-9mm-luger.htm>

45. Essentially assault weapons can be simply defined (under numerous State and local statutes) as semiautomatic copies of full automatic (or select fire) firearms designed and intended for use by the military. They retain features and performance characteristics (in terms of muzzle velocity, range etc.) originally designed and intended for use on the battlefield.

46. Following the passage of the Federal and numerous State and local assault weapon bans in the 1990s, the firearm industry via the National Shooting Sports Foundation (NSSF, a firearm industry trade and lobbying organization) reversed course and coined the moniker “Modern Sporting Rifle” to describe semiautomatic variants of the fully automatic / select fire weapons.

## **V. DEVELOPMENT OF ASSAULT PISTOLS**

47. As with rifle-based assault weapons, many pistol caliber assault weapons can trace their lineage to firearms initially designed and intended for use by the military in combat as many are based on existing submachinegun designs. In fact, there has been a rise in the popularity of assault pistols which, being based on AK and AR receivers, (which themselves are based on fully automatic designs) that have the same performance as mentioned previously in regard to rifle-based assault weapons.

48. A submachine gun can generally be defined as a short or compact shoulder fired firearm which chambers and fires pistol caliber ammunition in select

fire or fully automatic mode, essentially a pistol caliber (i.e., “subcaliber”) machinegun.

49. Many of the construction and design features attributed to assault weapons, and the STG44, were first utilized in the design and manufacture of mid-20th century submachine guns. Nazi Germany entered the war with the innovative MP38 Maschinenpistole 38. It was chambered in 9mm and later, after several engineering changes, re-designated the P40. Its design features, later commonly found in assault weapons, included an adjustable stock, separate pistol grip, a detachable magazine and use of steel stampings in its construction.



Image Source: <https://www.19fortyfive.com/2021/01/hitler-vs-the-world-6-bestworld-war-ii-submachine-guns/>

50. While the United States initially entered World War II with a military variant of the Thompson .45 caliber submachinegun, it was heavy and expensive to manufacture as a number of the major components were machined from solid steel. Before the end of the war, the Thompson had been supplemented by the M3 “Greasegun” initially produced by General Motors. The receiver was a stamped



and welded sheet metal assembly with an adjustable sliding shoulder stock. Like the MP38, it had a separate pistol grip, a sliding / adjustable shoulder stock and a detachable box magazine with a 30-round capacity. In a utilitarian sense it was as effective as the Thompson and at approximately \$20, it was less than half as expensive for the U.S. Government to purchase.

51. The United Kingdom produced over one million Sten Submachine guns during WWII. A rugged and reliable firearm made largely from welded steel stampings it was utility and ease of manufacture both combined and perfected. Features shared with the M3 and MP40 included an adjustable and / or collapsible shoulder stock, a detachable box magazine and, on some variations, a barrel shroud allowing the operator to utilize the area surrounding the barrel as an auxiliary grip point without coming into contact with a heated barrel.

52. Prior to and during WWII, a number of other nations developed submachine guns which followed the same design and construction philosophy. Notable examples include the Soviet PPSH41, the Italian Beretta Model 38/42, and the Swedish Carl Gustav Model 45.

53. Following WWII, most new submachine gun designs continued the design philosophy which combined utility, ease of manufacture and the features of wartime firearms. In the early 1960s, HK introduced the MP5 which became an immensely popular choice for military and law enforcement agencies worldwide

due to its inherent reliability and accuracy. It was produced in multiple iterations to include a semiautomatic civilian version as well as a pistol variant without a provision for a shoulder stock (HK SP89).



Image Source: [https://www.gunsinternational.com/guns-for-saleonline/pistols/9mm-pistols/excellent-condition-factory-german-hk-sp89-9mm-pistol.cfm?gun\\_id=101037518](https://www.gunsinternational.com/guns-for-saleonline/pistols/9mm-pistols/excellent-condition-factory-german-hk-sp89-9mm-pistol.cfm?gun_id=101037518)

54. Israeli military Industries also successfully marketed their UZI and Mini Uzi submachineguns for export in select fire, and in civilian semiautomatic pistol variants.



Image Source: [https://www.military-today.com/firearms/uzi\\_pistol.htm](https://www.military-today.com/firearms/uzi_pistol.htm)

55. Additionally, a number of submachine gun designs proved unsuccessful in terms of military and government sales but nonetheless found a ready market when marketed as a semiautomatic pistol. Notable examples include the Cobray MAC-10 (and successive variants) and the Intratec TEC-9 which began life as a Swedish designed submachine gun, the Interdynamic MP-9.



Image Source: <https://www.armslist.com/posts/11522946/st-louis-missouri-handguns-for-sale--vulcan-mac-10>



Image Source: [https://www.egunner.com/intratec-tec-dc99mmpara,name,11952922,auction\\_id,auction\\_details](https://www.egunner.com/intratec-tec-dc99mmpara,name,11952922,auction_id,auction_details)

56. As with the rifle caliber assault weapons mentioned previously, the performance characteristics of pistol caliber assault weapons in regard to semiautomatic rate of fire, muzzle velocity, and effective range have not changed since their initial incarnation as military weapons. Pistols based on AR & AK receivers that fire rifle caliber ammunition (.223 / 5.56 mm) maintain approximately the same performance characteristics (in terms of range, muzzle velocity etc.) as assault weapons as described previously.

## **VI. DEVELOPMENT OF HIGH-CAPACITY MAGAZINES**

57. Modern semiautomatic rifles that are designed, manufactured and marketed as “hunting rifles” traditionally have had an internal magazine capacity of less than 10 rounds depending on caliber. For example, the Browning BAR, as

manufactured, has an internal magazine capacity of 4 rounds.

58. The operation (or cycle of fire) of any firearm designed and manufactured to accept a detachable magazine will function regardless of the maximum capacity of the magazine itself. For example, firearms such as the Beretta Model 92 semiautomatic pistol and AR-15 Type semiautomatic rifle will function as designed whether the operator utilizes a magazine limited to ten rounds or one of greater capacity. Generally speaking, any firearm capable of accepting a detachable magazine holding more than 10 rounds will also accept a magazine with a maximum capacity of ten rounds or fewer.

59. High-capacity magazines were not initially designed or intended for the civilian marketplace. The lineage of high-capacity detachable magazines can be traced directly to a military heritage. WWI introduced numerous magazine fed light machine guns to combat and the trend continued through WWII. As far as the individual infantryman's rifle was concerned in WWII the standard issue semiautomatic rifle for the U.S. Army as well as the U.S. Marine Corps was the M1 "Garand" chambered in .30-06. The M1 has an internal (non-detachable) magazine with a capacity of eight (8) rounds. It was not until the mid-1950s with the adoption of the M-14 that a rifle with a detachable magazine was approved as standard issue to front line members of the US Military.

60. Although technological advances in military firearms advanced at a rapid pace following WWII, large-capacity detachable magazines were not commonly marketed for the general public. For example, when Colt began production of the AR-15 (which became the M-16) for the US Military in the early 1960s it was initially issued with 20 round magazines. However, when Colt began marketing a “civilianized” semiautomatic variant for sale to the general public it was sold with two five (5) round magazines, not the 20 round magazines issued with the rifle to the U.S. Military.



**COLT AR-15 SPORTER  
SEMI-AUTOMATIC RIFLE  
.223 CALIBER**

Colt's answer to the demand for a semi-automatic version of the AR-15 automatic rifle purchased by The United States Armed Forces. Painsaking engineering redesign efforts have resulted in a Government-approved conversion of the Colt AR-15 automatic rifle without sacrificing any performance or weight characteristics. The semi-automatic AR-15 Sporter weighs only 6.3 pounds. Its recoil is light and barrel rise minimal.

**MODEL R-6000** **RETAIL PRICE\* \$189.50**

Lightweight • Extremely accurate • Easy to handle • Straight line construction — barrel, bolt, recoil buffer unit and stock assembled in a straight line • Rapid semi-automatic fire is more controllable than with rifles of commercial design • Simple to maintain.

CALIBER	BARREL LENGTH	OVERALL LENGTH	CAPACITY	SIGHTS	SAFETY	WEIGHT
.223	21"	39"	5 rounds	Double tang rear peep sight adjustable for windage. Post type front sight adjustable for elevation.	Rotary safety—selector lever	Approx. 6¾ lbs.

\*The suggested retail price of the Sporter is \$189.50 and includes two magazines (each blocked for five rounds), sling, flash suppressor, rubber recoil pad, cleaning rod assembly, cleaning brush, and the Colt AR-15 Sporter Operation and Maintenance manual.

Image Source: <https://thecoltar15resource.com/1964-catalog/>

61. Magazine fed light machine guns developed or deployed prior to and during WWI, and thereafter refined, improved the capability and reliability of this type of feeding mechanism on a large scale. The ability to fire an increased quantity of cartridges without reloading increases the lethality and effectiveness of small arms in combat. Less time required to reload can equate to more time spent acquiring targets or shooting.

62. To the best of my knowledge, any semiautomatic firearm capable of accepting a large-capacity detachable magazine will accept a magazine with a capacity of ten rounds or less. I have fired a significant number of handguns and rifles with magazines of varying capacities. The capacity of the magazine did not affect the ability of those firearms to function as designed.

## **VII. PROLIFERATION OF THE AR & AK PLATFORMS**

63. Since the late 1950s through the late 1960s the move towards adoption of semiautomatic and select fire rifles by military forces became a global phenomenon. Soviet Bloc nations rearmed with AK-type rifles (and their variants) while NATO Nations adopted a number of designs from Colt, HK and FN, as stated previously, around a standardized caliber rifle cartridge.

64. Several companies adapted these weapons, without changing their basic construction or design features, for civilian use. As stated previously, in the early 1960s Colt sought to capitalize on the military acceptance of the AR-15 /M-

16 and began to produce rifles, incorporating the same construction techniques and configuration as the AR-15 for sale on the civilian market. The only difference between the Colt-produced military and civilian versions was removal of select fire capability.

65. These civilian versions, including the Colt AR-15, retained the semiautomatic performance capacities of the full automatic military weapons they were based on, including the effective range, muzzle velocity and semiautomatic rate of fire. In addition, the weapons retained the capability to accommodate large-capacity magazines as originally issued for military use. Again however, the basic configuration, appearance, construction and operation of the internal gas operating system (as designed) has remained unchanged since its initial design and introduction as a full automatic military weapon.

66. The expiration of Colt's patents in the late 1970s naturally spawned competition in the marketplace. Throughout the design's lifespan many of the internal fire control components have remained unchanged and their specifications standardized industry wide. There are multiple internal parts that are completely interchangeable between military M16s manufactured in the 1960s by Colt and an AR-15 type rifle produced today by any one of hundreds of U.S. manufacturers that produce either receivers or internal operating parts. For example, a Bolt Carrier manufactured in 1967 by Colt will fit, and function as designed, in an AR



copy manufactured in 2023. Additionally, the overall configuration of “copycat” AR rifles remains essentially identical to the original production design of the early 1960s. The overall design configuration (two piece hinged receiver (shown below), shoulder stock in line with the chamber and barrel, placement of the magazine, external switches and other features) is identical or nearly so.

While employed at the ATF NLC, I was a custodian of the Laboratory’s Firearms Reference Collection. The firearms in the collection were regularly used by students in the National Firearms Examiner Academy and often required repair. I have personally replaced internal parts in older Colt AR-type rifles and Eastern Bloc manufactured AK rifles with recently manufactured parts from aftermarket vendors. The parts fit without issue and the firearms functioned as designed after the repair. The same internal parts will work in AK and AR pistols currently available commercially.

67. Due to their modular construction, AR-type rifles & pistols are easily constructed / configured with parts made by other manufacturers to suit the owner’s personal preference. The rifle receiver itself is designed as a two-piece unit and the “upper receiver” and “lower receiver” can be swapped out for other interchangeable pieces made by the same or another manufacturer with ease. The design also facilitates replacement of internal fire control components and assemblies.

68. Individual component pieces can be purchased allowing the

individual to build a custom AR-type rifle or pistol from the “ground up” as opposed to purchasing a complete firearm due to the standardization and interchangeability of parts and subassemblies. A good illustration of this ease of customization, and the plethora of interchangeable parts and accessories, is the fact that Brownell’s Inc., an established gun supply retailer in Iowa, currently devotes the first 107 pages of their “Big Book” (74th edition) catalog of parts and accessories to AR-type rifles & pistols alone:

<https://www.brownells.com/.aspx/bapid=835/ClientPage/brownells-catalog-74-pdfs>

69. The same holds true for AK-type rifles and, more recently, pistols available in the civilian market. Although the designs (and variants) of the AK-47 are more numerous than the AR-type rifle (as far as military production and use is concerned), it lags behind the AR in regard to domestic civilian popularity. Nonetheless whether the AK-type rifle is of Russian, Chinese or other former Eastern Bloc manufacture, there is a robust secondary market in the United States for accessories, parts, sub- assemblies etc. Although not as easily modified as an AR-style rifle or pistol due to its less “modular” design, there are customization options available including a variety of shoulder stocks, sighting and illumination, etc.

70. As with the AR, the general configuration and specifications of

internal AK operating parts and assemblies have remained consistent. Regardless of the place of manufacture, there are numerous internal fire control, feeding and gas operating system components that are interchangeable between AK rifles and pistols produced by manufacturers over the past 40-plus years. Again, as with AR-platform firearms, the overall configuration of the AK-platform receiver, internal operating systems and their parts, and performance (in terms of semiautomatic rate of fire, muzzle velocity, range etc.) are comparable to the full automatic military versions from which they evolved.

#### **VIII. OPINION: ASSAULT WEAPONS AND SELF / HOME DEFENSE**

71. Throughout their complaint, the Plaintiffs state that self-defense is one of the primary reasons for the purchase of an assault pistol, as defined by Hawaii law. It is my opinion that an AR- or AK- rifle or pistol is a poor choice for this purpose.

72. I have been asked on numerous occasions during my career what I would recommend for home or self-defense. My recommendation is based upon my inquiry in return regarding the individual's (and their family members') personal experience and comfort level with firearms. In over 25-plus years, I have never recommended an AR-, AK- based or other similar assault rifle or assault pistol as a home defense weapon.

73. Home defense and / or self-defense situations are rarely, if ever,

lengthy shootouts at long ranges with extensive exchanges of gunfire. Assault weapons were designed to be effective at battlefield ranges of up to 500 yards. The typical muzzle velocity of a .223 caliber bullet is 3,200 feet per second (+ or -). Projectiles travelling at velocities found in AK & AR pistols pose a serious risk of over-penetration in most home construction materials such as gypsum board / sheet rock, and typical 2x4 lumber. When this cartridge was designed for the AR-15 / M-16 it was intended to kill or incapacitate enemy combatants at distances of hundreds of yards, not dozens of feet.

74. In August 2014, the National Rifle Association's "American Rifleman" published an article by Stanton Wormley: "The AR-15 for Home Defense: Penetration Tests": <https://www.americanrifleman.org/content/the-ar-15-for-home-defense-penetration-tests/>. Wormley conducted penetration tests on nine different types of .223 / 5.56mm ammunition by firing them through simulated wall sections constructed of gypsum board / sheet rock and wooden 2x4 studs. When fired at a 90-degree angle to the walls, all nine (including "frangible" rounds designed to disintegrate when hitting a hard surface) easily penetrated the wall section as well as water jugs placed three feet behind:

"But just how much energy did the penetrating projectiles carry? All the loads, including the Glaser, exploded one-gallon water jugs placed 3 feet behind the wall sections."<sup>13</sup>

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<sup>13</sup> <https://www.americanrifleman.org/articles/2014/8/5/the-ar-15-for-home-defense-penetration->

The tests conducted by Wormley also included firing longitudinally through the wall sections, resulting in the penetration of three successive 2” thick 2x4 studs by a number of the projectiles. These tests vividly highlight the inherent dangers of utilizing assault weapons with high velocity ammunition in a home defense scenario.

75. Current U.S. Army issue .223 caliber ammunition is capable of penetrating 3/8” hardened steel at 350 yards. Potential over-penetration in a confined environment is problematic in terms of risk to bystanders or family members outside the target location. Most jacketed, commercially available 5.56mm ammunition has impressive penetration capabilities in this regard. Additionally, the (former) NATO issue M855 SS109 5.56mm is readily available for purchase by civilians. This ammunition was designed to penetrate up to 3mm of “soft,” (non-hardened) steel.

76. During a stressful situation such as a home invasion or break in there may be multiple steps required by the operator to bring the weapon from a safe condition to a firing condition. Manipulation of a charging handle, safety switch, or inserting a magazine may be difficult to accomplish under stress, particularly if the operator has not adequately trained or practiced with their firearm. Other family members may not be familiar with bringing the weapon to a firing condition or fail to complete adequate steps to do so under duress.

77. While employed as a Special Agent with ATF, the agency transitioned to an AR-type rifle in the early 2000s. Each Agent was required to attend, and successfully complete, a one week / 40 plus hour transition training class in order to familiarize themselves, and qualify, with the firearm. The training included repetitive live fire drills under stressful conditions. Additionally, we were required to requalify with these firearms quarterly and repeat the same drills as during the initial transition training. Nonetheless, I witnessed Agents make errors during those drills, although they had performed them repeatedly under stress, that resulted in a failure of the weapon to fire. It is worth noting here that the M4 carbines issued to ATF Field Offices were select fire rifles (i.e., machineguns capable of full automatic fire) that were converted to semiautomatic fire only.

78. In my opinion, based upon my training, knowledge, experience and research, assault pistols were not designed for traditional hunting purposes. Pistol caliber firearms (.380, 9mm, .45) are not a popular hunting caliber. Neither was the .223/ 5.56 caliber cartridge developed for civilian hunting applications. Due to .223 caliber / 5.56 mm bullets proven record of causing considerable tissue damage (when fired from an AR type rifle or pistol) it is a counterintuitive choice.

79. In terms of home defense and personal protection, I am of the opinion that assault weapons, whether in the form of a rifle or a pistol, are a poor choice for either purpose. Due to their weight and length, many assault pistols banned under

Hawaii law require two hands to effectively aim and shoot. Certainly the same can be said for a rifle. In a home defense situation an individual may be required to use one hand to call 911 while attempting to operate a “two handed” firearm with one hand. Such a situation would also preclude the homeowner from utilizing their “non gun hand” to pick up or guide a small child or vulnerable / handicapped adult during such an event. For example, the Daniel Defense DDM4V7P pistol with an attached “stabilizing brace” as shown here in their online catalog is 28.5 inches in length and weighs 5.34 pounds (85.4 ounces) unloaded.<sup>14</sup> By comparison, a Glock 17 pistol measures 4.4 inches long and weighs 1.37 pounds (22.05 ounces) unloaded.<sup>15</sup>



Image Source: <https://danieldefense.com/ddm4-v7p.html>

80. Essentially the types of firearms classified as assault pistols under Hawaii law, particularly AR- and AK- based firearms, are direct developmental descendants of full automatic military weapons designed for use in combat. The ‘civilian’ AR-15 type rifles and pistols in .223 / 5.56mm retains the same

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<sup>14</sup> <https://danieldefense.com/ddm4-v7p.html>

<sup>15</sup> <https://us.glock.com/en/pistols/g17>

performance characteristics (in terms of muzzle velocity, etc.) as does the military M-16 and its variants (M-16A2, M-4 etc.).

## **IX. ASSAULT WEAPONS AS A GENERAL THREAT TO PUBLIC SAFETY**

81. As mentioned previously in this report, many of the firearms prohibited by statute directly trace their origins to those developed for use in combat. As such, they were never initially intended for general distribution / sale to the public.

As tragically demonstrated by recent mass shootings such as the Pulse Nightclub in Orlando Florida in 2016 (49 fatalities, 50+ wounded), the 2017 Las Vegas shooting (60 fatalities, 400+ wounded), the 2022 Uvalde Texas School shooting (21 fatalities + 17 wounded), and the July 4th 2022 shooting in Highland Park (7 fatalities + 48 wounded), the assault weapons (in conjunction with high-capacity magazines) are capable of inflicting significant carnage upon civilians in a short period of time.

82. Many assault pistols as prohibited under Hawaii law pose a significant risk to law enforcement officers. It has been my experience that soft body armor issued to most uniformed officers has a “Level II” or “Level IIIA” National Institute of Justice (NIJ) protection rating. These two ratings are suitable for protection against most handgun bullets as those projectiles range up to a 1200FPS (+ or -) velocity. Rifle caliber pistols (AR- & AK- type) can, as stated previously in this report, achieve muzzle velocities of 3200FPS (+ or -) which can readily



penetrate Level II & IIIA body armor (as well as some Level III hard body armor which is not universal standard issue amongst law enforcement agencies nationwide). Not only do those assault pistols prohibited by Hawai‘i law pose a threat to overall public safety, they increase the likelihood that first responders charged with stopping such a threat, or attending to wounded citizens, may be injured or killed in the performance of their duty.

This online video illustrates the capability of commonly available .223 / 5.56mm caliber ammunition to penetrate hard plate Level III body armor. The author / narrator states that this test was performed at a distance of “about seven yards.”

<https://www.youtube.com/watch?v=oMYkEMhPsO8>

83. The argument that commercially available assault pistols are somehow less dangerous or lethal simply because they fire only in semiautomatic mode is misleading. They retain the identical performance capabilities and characteristics (save full automatic capability) as initially intended for use in combat. With even minimal training an operator can fire 40-50 shots per minute in semiautomatic mode.

84. According to the U.S. Army Manual, the most effective use of the M-16 at ranges beyond 25 yards is rapid semiautomatic fire, not full automatic fire. Such capability combined with the performance characteristics of .223 / 5.56

ammunition originally designed and intended for combat can, and have, resulted in catastrophic civilian mass casualty events.

**7-8. RAPID SEMIAUTOMATIC FIRE**

The most important firing technique during modern, fast moving combat is rapid semiautomatic fire. Rapid-fire techniques are the key to hitting the short exposure, multiple, or moving targets described previously. If properly applied, rapid semiautomatic fire delivers a large volume of effective fire into a target area. The soldier intentionally fires a quick series of shots into the target area to assure a high probability of a hit. (Figure 7-10, page 7-8 shows the current training program for rapid semiautomatic fire.)

**Figure 7-10. Rapid semiautomatic fire training program.**

a. **Effectiveness of Rapid Fire.** When a soldier uses rapid semiautomatic fire properly, he sacrifices some accuracy to deliver a greater volume of effective fire to hit more targets. It is surprising how devastatingly accurate rapid fire can be. At ranges beyond 25 meters, rapid semiautomatic fire is superior to automatic fire in all measures (shots per target, trigger pulls per hit, and even time to hit). The decrease in accuracy when firing faster is reduced with proper training and repeated practice.

I declare under penalty of perjury that the foregoing is true and correct.

DATED: Manchester, Maryland, February 13, 2023.

  
JAMES E. YURGEALITIS